
A New Polyploid Species of the Genus *Tragopogon* (Asteraceae, Cichorieae) from Russia

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ABSTRACT. *Tragopogon soltisiorum* Mavrodiev (Asteraceae, Cichorieae, Scorzonerinae) is described as a new species. The new species is a tetraploid ($2n = 24$), ruderal plant with long flowering and fruiting times and differs from the vast majority of *Tragopogon* L. species in its ability to reproduce vegetatively from adventitious shoots. The new species is known only from southern Russia and is found in two varieties—a typical variety and a new variety *latifolius* Mavrodiev.

Key words: Asteraceae, IUCN Red List, polyploidy, Russia, *Tragopogon*.

Tragopogon L. (Asteraceae, Cichorieae, Scorzonerinae) is an Old World genus of 110 to 150 species (Borisova, 1964; Bremer, 1994) that occurs across Eurasia. The chromosome number reported for most species of *Tragopogon* is $2n = 12$ (e.g., Nazarova, 1991). At least 12 species of *Tragopogon* are tetraploids or include tetraploid cytotypes (Singh & Kachroo, 1976; Wilson, 1983; Nazarova, 1991, 1995; Ghaffari, 1999; Díaz de la Guardia & Blanca, 2004). The most well-known polyploids are two allotetraploid species, *T. mirus* Ownbey and *T. miscellus* Ownbey, which formed in North America in the early 1900s following the introduction of three diploids from Europe (Ownbey, 1950).

Most of the known *Tragopogon* tetraploids occur in western Asia and only three, that are narrow endemics, are considered part of the European flora sensu *Flora Europaea* (Richardson, 1976): *T. cupani* Gussone ex DC. (Sicily, Italy), *T. castellanus* Levier (northern half of the Iberian Peninsula), and *T. cazorlanum* C. Díaz & Blanca (mountains of Cazorla and Segura, Spain) (Zangheri, 1976; Díaz de la Guardia & Blanca, 2004). The Spanish endemic *T. pseudocastellanus* Blanca & C. Díaz also appears to be

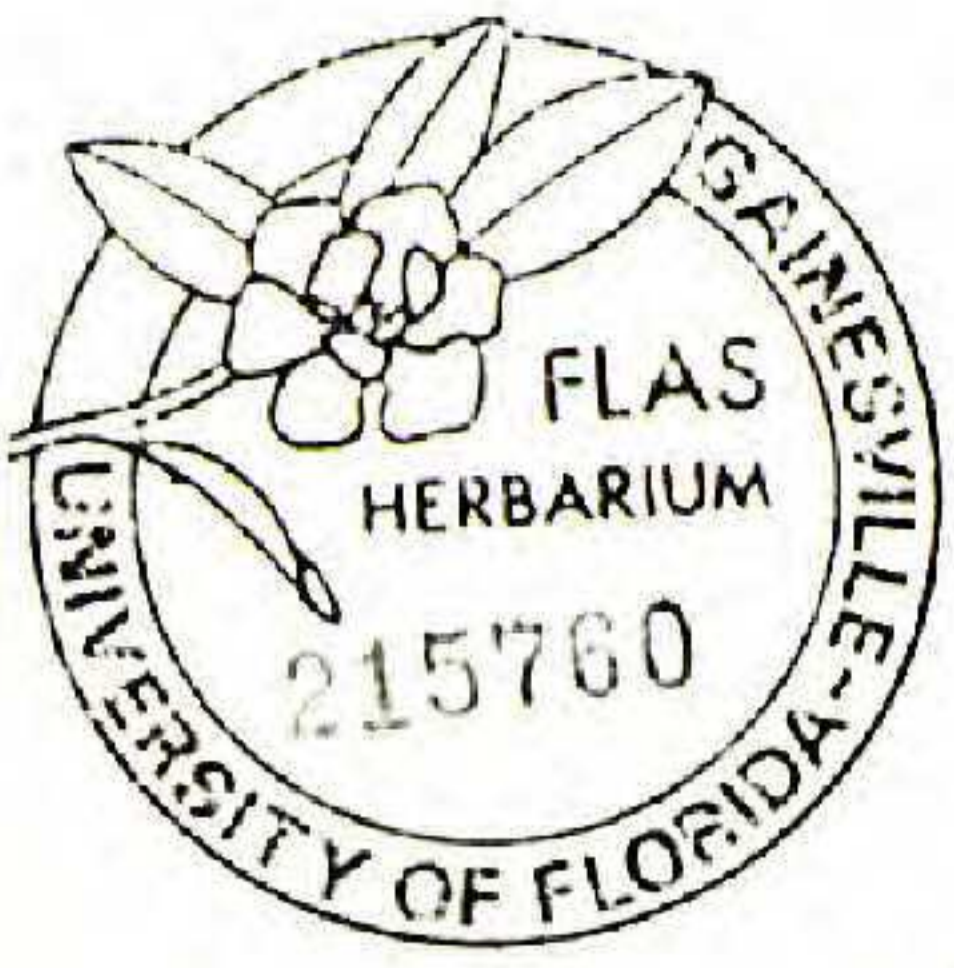
polyploid based on the size of the pollen (Blanca & Díaz de la Guardia, 1996), but no chromosome count of *T. pseudocastellanus* is available. In the southern portion of European Russia, several populations of an unknown polyploid *Tragopogon* have recently been discovered.

Material used for the current study was successfully grown in the greenhouse of the Botany Department of the University of Florida (Gainesville) from seeds collected in May 2001 in the southeastern part of European Russia near the city of Astrachan (FLAS 215760, FLAS 215761). Mitotic chromosomes were studied using root meristems obtained from the above cultivated plants. The root tips were pretreated with 8-hydroxyquinoline, fixed in ethyl alcohol–acetic acid (3:1), hydrolyzed in 1N HCl, stained in an acetic orcein solution, and then squashed and the chromosomes counted using light microscopy.

1. *Tragopogon soltisiorum* Mavrodiev, sp. nov.
TYPE: Russia. Astrachan Oblast: vic. of city of Astrachan, 15 May 2001 [type from seed cultivar, Univ. of Florida, Gainesville, Botany Greenhouse, 4 Aug. 2005], *Evgeny V. Mavrodiev 1* (holotype, FLAS 215760; isotype, FLAS 215759). Figures 1, 2.

Herba perennis, gemmis radicalibus dormientibus vix conspicuis sed numerosissimis; axe primario deflorato ablatove, haec gemmae soboles numerosas plerumque formantes. Bractee involucrales quam flores ligulati semper breviores; flores marginales semper pallide lutei, striis 3 to 5 plus minusve conspicuis violaceis in pagina superiore ornati; rostrum achaenii breve.

Perennial herb 0.3–1.7 m, glabrous or scaberulous generally at leaf bases and below capitula; primary root extensively branched, shoots adventitious from root buds from entire root system after flowering or after cutting the main axis of plant (Fig. 2A). Rosette



Tragopogon soltisiorum Mavrodiev
det. Evgeny V. Mavrodiev 25 January 2006

University of Florida Herbarium (FLAS), Gainesville, Florida, USA

CULTIVATED PLANTS OF FLORIDA

<Asteraceae>
Tragopogon

Tragopogon pamelaedouglasii Mavrodiev sp. nov.

ALACHUA COUNTY: Gainesville: University of Florida campus; cultivated in Botany Department greenhouse. Seeds obtained from Russia: Astrachan region; near Astrachan. May 15, 2001. This plant is a widespread weed in the region. Flowers are yellow with several violet strips.

coll. Evgeny V. Mavrodiev # 1 4 Aug 2005

Additional material: photos; sample for DNA analysis.

Vouchers for: Evolution of polyploidy and cryptic species in *Tragopogon* (Asteraceae), Evgeny V. Mavrodiev, Douglas Soltis, Pamela Soltis, et al.

Figure 1. Holotype of *Tragopogon soltisiorum* Mavrodiev (*E. V. Mavrodiev 1*, FLAS 215760).

leaves numerous, to 45, rosette leaf laminae wider than stem leaves, $8-50 \times (0.6-0.7-1.2(-2.0))$ cm, with 5 to 9 evident parallel nerves, margins entire or crenate, lanceolate or narrowly lanceolate; middle nerve extends beyond lamina as mucro; stem leaves without sheaths, $3-35 \times (0.2-0.3-1.0)$ cm, narrowly

lanceolate, acute, with 5 to 7 well-formed nerves. Fertile stems solitary, simple or once (twice) branched from the middle, terminating into a capitulum, not swollen below the capitulum. Capitula to 35 mm, solitary; involucre bracts (= phyllaries) 8 to 10, triangular or lanceolate,



Figure 2. *Tragopogon soltisiorum* Mavrodiev. —A. Adventitious shoots. —B. Violet stripes on the adaxial side of *T. soltisiorum* ligules. —C. Capitula of variety *latifolius*. —D. Karyotype of variety *soltisiorum* ($2n = 24$). —E. Karyotype of variety *latifolius* ($2n = 24$).

glabrous or scabrous, 25–30(–35) mm, always shorter than marginal florets. Florets with pale yellow ligules, 25–30(–33) mm, bearing 3 to $5 \pm$ obvious violet stripes adaxially (Fig. 2B); anthers 3–

3.3(–3.5) mm. Achenes with gray or partly rose plumose pappus, (17–)20–22 mm, \pm equal to achene body, with short but well-developed beak, to 7(–8) mm, distinct from numerous protuberances,

to 0.02 mm, covering the remainder of non-ribbed achene body; germination epigeous.

1a. *Tragopogon soltisorum* var. *soltisorum*

1b. *Tragopogon soltisorum* var. *latifolius* Mavrodiev, var. nov. TYPE: Russia. Astrachan Oblast: vic. of city of Astrachan, 15 May 2001 [type from seed cultivar, Univ. of Florida, Gainesville, Botany Greenhouse, 4 Aug. 2005], *Evgeny V. Mavrodiev 2* (holotype, FLAS 215762; isotype, FLAS 215761).

A varietate typica foliis latioribus (usque ad 20 mm latis) et additione inflorescentia 2- ad 3-calathidiata differt.

The variety *latifolius* differs from the typical one by its wider leaf laminae (to 20 mm) and by its additional capitula to 2 or 3 in number (Fig. 2C).

Chromosome number. The chromosome number $2n = 24$ was found in the plants of both varieties (Fig. 2D, E).

Distribution and IUCN Red List category. *Tragopogon soltisorum* is known only from the Astrachan region (southeastern Russia). It was widely distributed in the vicinity of the city of Astrachan in 2001–2002. The new taxon and its new variety are considered mostly ruderal plants.

We estimate the current area of distribution of both varieties of the new tetraploid as 5000–20,000 km², and the number of localities as more than 10. All populations are fluctuating in size. Based on these facts, the species could be considered as Vulnerable (VU) according to IUCN Red List criteria (IUCN, 2001).

Phenology. In natural habitats, the new species flowers and fruits in April and May until the second half of October (A. Laktionov, pers. comm.). This is a longer anthesal time compared to other species of *Tragopogon* (including all sympatric species from the Astrachan region), which bloom and fruit from (April) May to August (September).

Etymology. The new polyploid species is named in honor of professors Douglas E. Soltis and Pamela S. Soltis.

Discussion. *Tragopogon soltisorum* is a highly variable taxon. The new species differs from most of *Tragopogon* (including all known polyploids) by the formation of adventitious shoots. In gross morphology, *T. soltisorum* appears similar to *T. graminifolius* DC. or *T. orientalis* L., but it differs from both in possessing violet stripes on the dorsal side of its ligules and by the adventitious shoots. Underground organs and the details of life history clearly require further investigation.

KEY TO *TRAGOPOGON SOLTISORUM* AND SIMILAR SPECIES

- 1a. Biennial; involucre bracts shorter than or \pm equal to ligules; the latter are golden yellow, without stripes *T. orientalis*
- 1b. Perennial; involucre bracts longer than or \pm equal to ligules; the latter are yellow or pale yellow, with or without stripes 2
- 2a. Ligules are yellow, without stripes; root buds and adventitious shoots are absent. *T. graminifolius*
- 2b. Ligules are pale yellow, with \pm obvious violet stripes on adaxial side; root buds and adventitious shoots are present *T. soltisorum*

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